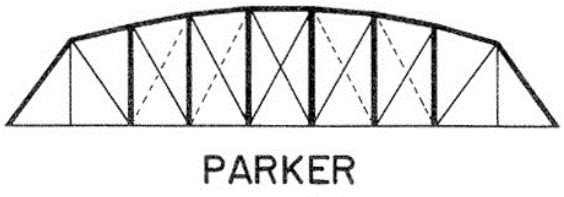
Structure Guide: Parker Through Truss



Left: IH 20 North Frontage Road at Brazos River, Parker County, 1934
Right: Parker truss. HAER truss chart

Description:

A Parker truss is a Pratt truss (diagonals in tension, verticals in compression) with a polygonal top chord of more than five slopes. The top chord is composed of inclined straight members, with the angle of inclination changing at the panel points. By increasing the number of slopes in the top chord, the Parker provides greater strength than the Pratt and could be used for longer span lengths, usually up to 250 feet or more.

Character Defining Features:

- Pratt truss web configuration (verticals in compression, diagonals in tension)
- Polygonal top chord with more than five slopes
- Inclined end posts
- Through truss configuration (struts, sway bracing, and lateral bracing above roadway)

Other Typical Features:

- Diagonal counters on some examples (can be character defining if part of original design)
- Portal bracing or struts on some examples (can be character defining if part of original design)
- Lateral bracing (not character defining)
- Floor beams (not character defining)
- Stringers (not character defining)

Variants

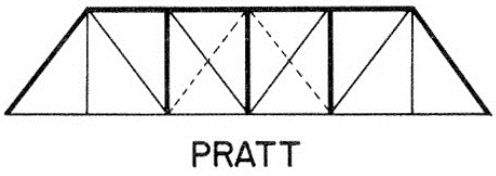
Camelback (a Parker truss with exactly five top chord slopes including the inclined endposts; through and pony versions)

Parker pony (without struts, sway bracing, and lateral bracing above roadway)

Pennsylvania (a Parker with sub-struts or sub-ties)

K-truss (a Parker with subdivided panels with a vertical and two diagonals forming a K shape in each panel)

Structure Guide: Pratt Truss



Left: CR 232 at San Marcos River Bridge, Gonzales County, 1898.
Right: Pratt truss configuration. HAER truss chart

Description

While there are many variants of the Pratt truss, it is defined by its use of vertical web members in compression and diagonal web members. Typically, vertical members of a Pratt truss are thicker to resist compression, while diagonal members are thinner. In the most common variant in Texas, the parallel chord Pratt through, the top chord is horizontal and parallel to the bottom chord except at the endposts, which are inclined. A Pratt through truss has bracing (portal, struts, lateral, and sway) located above the roadway connecting the trusses.

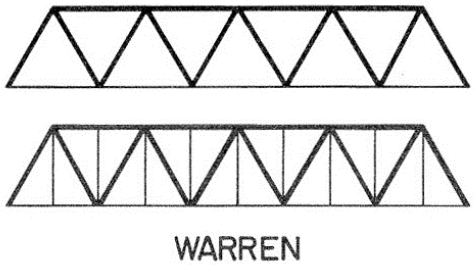
Character Defining Features:

- Verticals in compression
- Diagonals in tension, slanting down and in towards center typically at a 45-degree angle
- Parallel top and bottom chords
- Through truss configuration (struts, sway bracing, and lateral bracing above roadway)
- Inclined end posts

Other Typical Features:

- Diagonal counters on all but the shortest examples (can be character defining if part of original design)
- Portal bracing or struts on some examples (can be character defining if part of original design)
- Bottom lateral bracing (not character defining)
- Floor beams (not character defining)
- Stringers (not character defining)

Structure Guide: Warren Parallel pony[1]



Left: Plemmons Road at Canadian River Bridge, Austin Bridge Company, 1926.
Right: Warren truss without (above) and with (below) verticals. HAER truss chart

Description

The parallel chord Warren pony truss is a half through truss with zig-zag (/\/\/\) pattern to the web members and is the most common metal truss type surviving in Texas. The top chord is parallel to the bottom chord except at the endposts, which are inclined. Variants of the basic design include one or two sets of verticals. The verticals either brace the top chord against buckling under compression or support intermediate floor beam connections.

Character Defining Features:

- Diagonals carry both compression and tension
- Parallel chords
- Inclined end posts
- Half-through/pony deck configuration
- Variants with one or two sets of verticals

Other Typical Features:

- External sway braces (can be character defining if part of original design)
- Floor beams (not character defining)
- Stringers (not character defining)

[1] The technical term preferred by engineers is “half-through.” “Pony” is used herein as a convenience and out of familiarity.

Variants:

Warren polygonal pony (top chord with more than three segments including the endposts)

Warren through (portal, lateral, and sway bracing above the roadway connecting the trusses)

Continuous (continues uninterrupted over one or more intermediate supports or piers)

Variants:

Pratt Pony (no overhead bracing)

Pratt Half-hip (inclined endposts do not horizontally extend across the full length of the end panels)

Murphy-Whipple (parallel top chord through with diagonals connecting two panels)

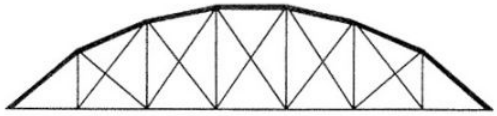
Bedstead Pony (parallel top chord Pratt pony with vertical endposts extending below the bottom chord)

Variants with separate treatment in this Guide:

Parker

Lenticular

Structure Guide: Bowstring



Left: CR 179 at Big Elm Creek, Falls County, King Iron Bridge Co., 1884.
Right: Bowstring arch truss configuration. HAER truss chart

Description

The bowstring truss has a curved shape resembling a bow or arch, with a curved or polygonal top chord in compression tied by a horizontal lower chord in tension. The deck is carried by a series of verticals and diagonals in the truss web that are all placed under tension. The bowstring was one of the earliest metal truss forms that bridge builders brought to Texas.

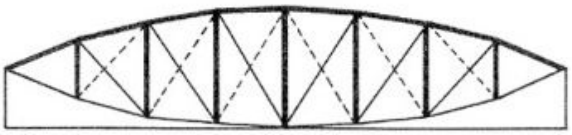
Character Defining Features:

- Curved or polygonal top chord
- Eye-bar bottom chord
- Threaded rod connections
- Diagonals serving as top-chord bracing, verticals supporting the deck
- Half-through/pony deck configuration

Other Typical Features:

- External sway braces (character defining if part of original design)
- Floor beams (not character defining)
- Stringers (not character defining)

Structure Guide: Lenticular pony[1]



Left: South Presa Street Bridge, San Antonio, Berlin Iron Bridge Co., 1890.
Right: Lenticular truss configuration. HAER truss chart

Description

Lenticular trusses have polygonal top and bottom chords, forming a lens shape, supported by vertical endposts. All Texas examples use the Pratt configuration webbing.

Character Defining Features:

- Polygonal top and bottom chords
- Eye-bar bottom chord
- Pin connections
- Pratt web configuration (diagonals in tension, verticals in compression)
- Half-through/pony deck configuration

Other Typical Features:

- External sway braces (can be character defining if part of original design)
- Floor beams (not character defining)
- Stringers (not character defining)

Variants:

Lenticular through (portal, lateral, and sway bracing above the roadway connecting the trusses)

[1]The lenticular trusses in Texas are actually Pauli trusses. Lenticular is used of custom and familiarity.